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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/029,659	10/22/2001	Otto J. Prohaska	03141-P0380A WWW/DC	4969
24126	7590	04/15/2005	EXAMINER	
ST. ONGE STEWARD JOHNSTON & REENS, LLC			OLSEN, KAJ K	
986 BEDFORD STREET			ART UNIT	
STAMFORD, CT 06905-5619			PAPER NUMBER	
			1753	

DATE MAILED: 04/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/029,659

Applicant(s)

PROHASKA ET AL.

Examiner

Kaj K. Olsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 20-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 20-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. It is unclear what purpose claim 22 serves. Wetting the membrane after the sensor is made would not appear to be part of the method of making the sensor, which is what is now being claimed. Wetting the membrane after making the sensor constitutes an intended use. Furthermore, this claim only refers to wetting the membrane passively and does not explicitly recite any step of actually wetting the membrane.

### ***Claim Rejections - 35 USC § 103***

4. Claims 20-22 and 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1 037 041 A2 in view of any one or more of Shen et al (USP 5,650,054), Fray et al (USP 4,879,005), Lawrence et al (USP 4,272,353), Debe et al (USP 6,319,293) or Surampudi et al (US 2001/0050230 A1).
5. EP '041 discloses a method for making a sensor that comprises the steps of providing a substrate 21, placing at least one opening 22 in the substrate, placing an electrode (23, 24, 28) proximate to the at least one opening and contacting a ionomer membrane 25 to the substrate and electrode. See fig. 4 and paragraphs 0031 through 0033. With respect to the ionomer membrane

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being “dry”, EP ‘041 never specifies whether the membrane is wet or dry during the hot pressing stage of sensor construction. However, numerous references teach that the membrane can be “dry” during electrochemical cell construction. Shen teaches that the membrane is to be dried prior to sensor construction. See col. 15, ll. 21-25. Fray teaches that the membrane is to be air dried prior to attaching the membrane to a substrate. See col. 2, ll. 39-46. Lawrence teaches that keeping the membrane dry during sensor construction allows the membrane to be roughened providing greater adhesion and catalytic activity for the sensor. See col. 11, l. 62 through col. 12, line 48. Debe also teaches that the membrane should be dried prior to construction of an electrode-membrane assembly. See col. 16, ll. 50-61 and col. 31, ll. 17-31. Surampudi teaches that a membrane should be mopped dry prior to electrochemical cell construction. See paragraph 0127. A mopped dry membrane would read on “dry” giving the claim language its broadest reasonable interpretation. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teachings of any of Shen, Fray, Lawrence, Debe or Surampudi and utilize a dry form of membrane during the contacting step of EP ‘041 because the prior art repeatedly recognized the use of the dry form of the membrane.

6. Moreover, Lawrence teaches that conventional hot-pressing (i.e. the technique utilized by EP ‘041) utilizes temperature of 182-188 °C (see col. 12, ll. 33-35), which greatly exceeds the boiling temperature of water. Hence this indicates that in order for one to hot-press a membrane to a substrate surface, one would have had to apply enough heat to dry the membrane first because thermodynamically the membrane could not get to those temperatures until the water was driven from the membrane anyway. In view of this, one possessing ordinary skill in the art would have recognized that a dry form of the membrane would have been preferable for hot-

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pressing because the hot-pressing stage would have occurred more quickly with less heat application for an already dried membrane over a wet membrane. Moreover, even if a “wet” membrane were utilized for the hot-pressing step, as discussed above the membrane would have been dried during that hot-pressing stage anyways and would still have met the claim requirement that the membrane be “dry” during the contacting step.

7. With respect to aligning the electrode with a gas passage, see fig. 4.

8. With respect to wetting the dry ionomer membrane, this would not appear to be an actual step of making the sensor and hasn't been further due consideration (however, see discussion of Shen below).

9. EP '041 further discloses a counter electrode (4, 14, 24) and a reference electrode 28. See paragraph 0048 as an example. With respect to wetting the membrane, applicant does not appear to positively recite a step of wetting the membrane (however, see discussion below).

10. With respect to the presence of a reservoir, Shen discloses utilizing a reservoir to ensure that the membrane remains hydrated regardless of the humidity level of the air. See col. 7, ll. 50-61. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to add the reservoir of Shen to manufacturing of EP '041 in view of any of Shen, Fray, Lawrence, Debe or Surampudi in order to manufacture a sensor that provides consistent response regardless of humidity level of the measured gas.

11. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP '041 in view of any one or more of Shen, Fray, Lawrence, Debe or Surampudi as applied to claim 20 above and in further view of LaConti et al (USP 4,820,386).

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12. The references set forth all the limitations of the claim and EP '041 further disclosed the presence of a layer (2 or 22) for slowing inputs of gas moving through the at least one opening. However, EP '041 did not explicitly disclose that said layer could be a polymer. LaConti teaches this layer can comprise polymers. See col. 3, ll. 62-65; col. 5, ll. 49-58 and col. 6, ll. 59-68. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of LaConti for the method of EP '041 and any one of Shen, Fray, Lawrence, Debe or Surampudi because the substitution of one known diffusion material for another requires only routine skill in the art.

13. Claims 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP '041 in view of any one or more of Shen, Fray, Lawrence, Debe or Surampudi with evidence from, or in further view of, Beech et al (Carbon Monoxide Sensors, Electrochemistry at Loughborough, pp. 1-4, 1999).

14. These claims differ from claim 20 in specifying the presence of a hole in the dry ionomer membrane. However, this broadly defined "hole" would read on any pores that might be present in the ionomer membrane itself. Beech evidences that Nafion inherently has gas permeability and water diffusion properties. See p. 2. In order for Nafion to provide gas permeability and water diffusion, Nafion must possess some degree of porosity and this degree of porosity would read on the claimed "hole" giving the claim language its broadest reasonable interpretation.

15. Alternatively, even if all forms of Nafion are not gas permeable and water diffusible and Beech cannot be utilized to evidence that the particular Nafion of EP '041 was gas permeable and water diffusible, Beech is drawn to a gas sensor and teaches that gas permeability and water diffusion properties of the Nafion desired for its sensor. Presumably, these properties are desired

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because a hydrated Nafion has an improved sensor response (see discussion of Shen above) and the permeability would improve the sensitivity and response time of the sensor. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Beech for the method of EP '041 in view of any one or more of Shen, Fray, Lawrence, Debe or Surampudi in order to improve the sensitivity, sensor response and response times for the sensor.

16. Claims 20-22 and 24-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prohaska et al (USP 6,682,638) in view of any one or more of Shen, Fray, Lawrence, Debe or Surampudi

17. The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).



18. Prohaska is drawn to substantially the same sensor as set forth by the instant invention. In particular, Prohaska discloses placing hole 20 through both the substrate 10 and the ionomer membrane 5, placing a number of electrodes (3, 7, 8) in proximity to the hole, and teaches the presence of a reservoir 9 for hydrating the sensor. See fig. 1 and col. 2, l. 66 through col. 3, l. 42. Prohaska differs from the claims of the instant invention by specifying that the ionomer membrane is dry during the contacting step of manufacture. However, numerous references teach that the membrane can be “dry” during electrochemical cell construction. Shen teaches that the membrane is to be dried prior to sensor construction. See col. 15, ll. 21-25. Fray teaches that the membrane is to be air dried prior to attaching the membrane to a substrate. See col. 2, ll. 39-46. Lawrence teaches that keeping the membrane dry during sensor construction allows the membrane to be roughened providing greater adhesion and catalytic activity for the sensor. See col. 11, l. 62 through col. 12, line 48. Debe also teaches that the membrane should be dried prior to construction of an electrode-membrane assembly. See col. 16, ll. 50-61 and col. 31, ll. 17-31. Surampudi teaches that a membrane should be mopped dry prior to electrochemical cell construction. See paragraph 0127. A mopped dry membrane would read on “dry” giving the claim language its broadest reasonable interpretation. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teachings of any of Shen, Fray, Lawrence, Debe or Surampudi and utilize a dry form of membrane during the contacting step of Prohashka because the prior art repeatedly recognized the use of the dry form of the membrane.
19. Moreover, Prohaska suggests the use of “heat” for its contacting step (see col. 7, ll. 23-25). Lawrence teaches that hot-pressing (i.e. a conventional technique for attaching an ionomer



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membrane to other substrates via heat (see EP '041 and Lawrence)) utilizes temperature of 182-188 °C (see col. 12, ll. 33-35), which greatly exceeds the boiling temperature of water. Hence this indicates that in order for one to hot-press a membrane to a substrate surface, one would have had to apply enough heat to dry the membrane first because thermodynamically the membrane could not get to those temperatures until the water was driven from the membrane anyway. In view of this, one possessing ordinary skill in the art would have recognized that a dry form of the membrane would have been preferable for hot-pressing because the hot-pressing stage would have occurred more quickly with less heat application for an already dried membrane over a wet membrane.

20. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Prohaska in view of any one or more of Shen, Fray, Lawrence, Debe or Surampudi as applied to claim 20 above and in further view of LaConti.

21. This claim differs by setting forth the use of a polymer layer over the electrode. This claim is rendered obvious in view of LaConti for the same reasons given above.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Thursday from 5:30 A.M. to 3:00 P.M. and on alternate Fridays.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AU 1753  
April 13, 2005



**KAJ K. OLSEN**  
**PRIMARY EXAMINER**